



(11) Publication number : **0 621 025 A2**

(12) **EUROPEAN PATENT APPLICATION**

(21) Application number : **94302838.1**

(51) Int. Cl.⁵ : **A61G 7/012**

(22) Date of filing : **21.04.94**

(30) Priority : **21.04.93 GB 9308516**

(43) Date of publication of application :
26.10.94 Bulletin 94/43

(84) Designated Contracting States :
**AT BE CH DE DK ES FR GB GR IE IT LI LU MC
NL PT SE**

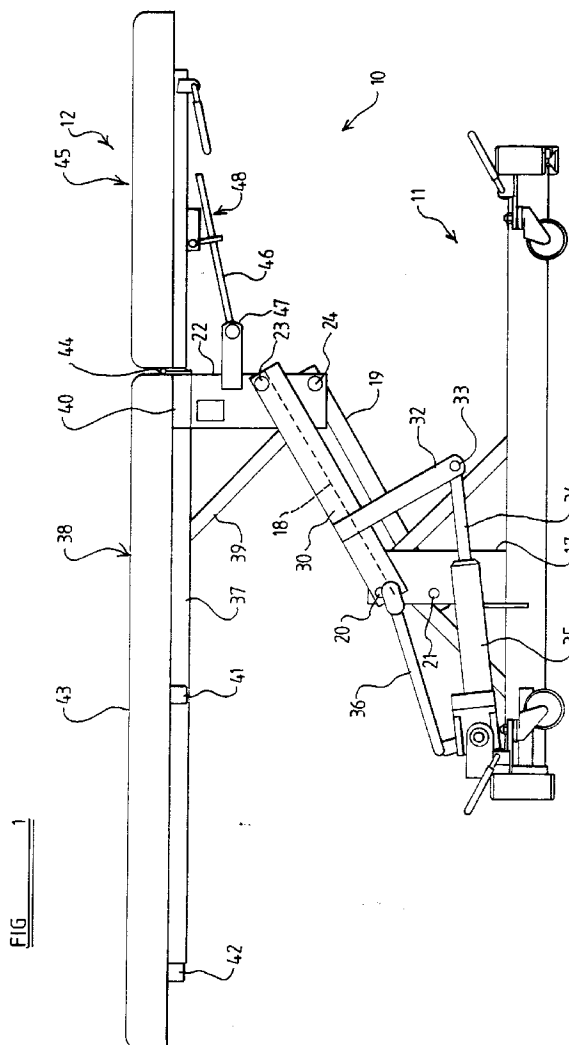
(71) Applicant : **HOSKINS HEALTHCARE LIMITED**
Upper Trinity Street
Birmingham B9 4EQ (GB)

(72) Inventor : **Chapman, Howard Selwyn**
"Stepping Stones"
57 Athelstan Road
Bitterne
Southampton F02 4DE (GB)

(74) Representative : **Leach, John Nigel et al**
FORRESTER & BOEHMERT
Franz-Joseph-Strasse 38
D-80801 München (DE)

(54) **Patient support.**

(57) A patient support comprising a base, a support part and a linkage to mount the support part on the base for movement up and down relative to the base, wherein the linkage comprises a pair of upper and lower links pivotally connected at their one ends to the base at vertically spaced positions and pivotally connected at their other ends to the support part at vertically spaced positions, and drive means to cause the support part to move up and down relative to the base as a result of pivotal movement of the links.



This invention relates to a patient support such as a hospital bed or chair.

An object of the invention is to provide a new and improved patient support.

According to one aspect of the invention, we provide a patient support comprising a base, a support part and a linkage to mount the support part on the base for movement up and down relative to the base, wherein the linkage comprises a pair of upper and lower links pivotally connected at their one ends to the base at vertically spaced positions and pivotally connected at their other ends to the support part at vertically spaced positions, and drive means to cause the support part to move up and down relative to the base as a result of pivotal movement of the links.

The links may be pivotally mounted on one side of an upwardly extending mounting part provided on the base and on one side of a downwardly extending mounting part provided on the support part.

The linkage may include a further link pivotally connected at one end to the base and at its other end to the support part about axes which are co-axial with the axes of pivot of the upper of said pair of upper and lower links.

The further link may be disposed on the opposite side of said mounting parts to said pair of upper and lower links.

Alternatively, particularly where the support part is relatively wide, two pairs of upper and lower links may be provided each pair being pivotally connected at their one ends to the base at vertically spaced positions and pivotally connected at their other ends to the support part at vertically spaced positions.

The links of one pair may be pivotally mounted on one side of an upwardly extending mounting part provided on the base and one side of a downwardly extending mounting part on the support part whilst the links of the other pair may be pivotally mounted on the other side of a second upwardly extending mounting part provided on the base and on the other side of a second downwardly extending mounting part provided on the support part, said other sides facing in the opposite direction to said one side.

The linkage may include a further link pivotally connected at one end of the base about the axis of pivotal connection of the upper of each pair of links to the base and at its opposite end to the support part about the axis of pivotal connection of the upper link of the pair of links to the support part with the further link being disposed between the upwardly extending mounting parts provided on the base and the downwardly extending mounting part provided on the support part.

In both alternatives:-

The drive means may act on the further link.

The further link may have a lever connected thereto to extend transversely therefrom and an actuator of the drive means may be connected to the

lever at a position spaced transversely from the line joining the axis of pivot of the further link.

The actuator may comprise a drive member of an electric screw jack or of a manually or power operated hydraulic jack.

The base may comprise a generally centrally disposed longitudinally extending member and, at opposite ends thereof transversely extending members provided with a ground-engageable means, the patient supporting part being carried by the longitudinally extending member.

According to a second aspect of the invention, we provide a patient support comprising a base and support part mounted on the base where the base comprises a generally centrally disposed longitudinally extending member and at opposite ends thereof transversely extending members provided with ground-engageable means, the patient supporting part being carried by the longitudinally extending member.

In both first and second aspects of the invention, the transversely extending member of one end of the base may extend perpendicular to the longitudinally extending member.

The transversely extending member at one end of the base may comprise a pair of inclined elements which diverge longitudinally and transversely from the longitudinally extending member.

In the first aspect of the invention, the upwardly extending mounting part may extend upwardly from the longitudinally extending member.

The longitudinally extending member may comprise a single circular cross-section tube and, where a single upwardly extending mounting part is provided, the upwardly extending mounting part may extend upwardly from the tube.

Alternatively, the longitudinally extending member may comprise a pair of spaced parallel circular cross-section tubes interconnected by transversely extending members and where two upwardly extending mounting parts are provided, one mounting part may extend from each of the tubes.

The support part may comprise a first section having at least one further section pivotally connected thereto for movement about a horizontal axis.

The support part may comprise a first section from which the downwardly extending mounting part depends downwardly.

The first section may comprise a single longitudinally extending member having opposed ends to at least one of which a further section is pivotally connected.

The downwardly extending mounting part may be disposed adjacent one end of the first section.

The upwardly and downwardly extending mounting parts may be provided with longitudinal bracing from the associated base or support part respectively.

The support part may comprise a bed and where the linkage comprises said two pairs of parallel linkage, the bed may have a width of at least 40cm.

Alternatively, the support part may provide a chair.

When the support part provides a bed, the drive means may be carried on the base beneath the foot end of the bed.

When the support part provides a chair, the drive means may be carried on the base beneath the head end of the chair.

When the support part provides a chair, there may be two further sections connected to the first section, namely a legrest section and a backrest section provided at opposite ends of the first section.

Means may be provided to interlink the backrest section and the legrest section so that pivotal movement of one is accompanied by a corresponding movement in the other.

The legrest section may be provided with a pivotally adjustable footrest section.

When the support part provides a chair, the support part may be upholstered with seamless contoured firm type upholstery.

According to a third aspect of the invention, we provide a patient support comprising a base and a support part mounted on the base and comprising a chair, the chair being provided with at least one armrest connected to the chair for movement between a position in which the armrest extends generally longitudinally of the chair to a position in which the armrest extends transversely outwardly of the chair.

According to the first and second aspects of the invention, the patient support may comprise a chair and the chair may be provided with an armrest connected to the chair for movement between a position in which the armrest extends generally longitudinally of the chair a position in which the armrest extends transversely outwardly of the chair.

The armrest may also be mounted for pivotal movement about a generally horizontal axis between a position in which the armrest extends generally longitudinally of the chair in a generally horizontal position and a position in which the armrest is inclined upwardly.

The armrest may be connected to the chair by a linkage comprising a pair of unequal length links pivotally connected at their one ends to the armrest and at their other ends to the chair, the pivotal connections of each link lying on a line and the lines being parallel.

Embodiments of the invention will now be described by way of example with reference to the accompanying drawings, wherein:-

FIGURE 1 is a side elevation of a bed embodying the invention and having a hydraulic drive means; FIGURE 2 is a side elevation of another bed embodying the invention provided with an electrical drive means;

FIGURE 3 is a plan view of the base part and linkage of the bed of Figure 1, with parts omitted for clarity;

FIGURE 4 is a view similar to that of Figure 3 but of the bed of Figure 2;

FIGURE 5 is a plan view, with parts omitted for clarity, of the bed of Figure 2;

FIGURE 6 is a side elevation of another bed embodying the invention;

FIGURE 7 is a view similar to that of Figure 2 but of the bed of Figure 6;

FIGURE 8 is a side elevation of a chair embodying the invention;

FIGURE 9 is a plan view similar to that of Figure 2 but of the chair of Figure 8;

FIGURE 10 is a perspective view of the chair of Figure 8;

FIGURES 11 and 12 are diagrammatic illustrations of an arm mounting means of the chair of Figure 8 with parts omitted for clarity.

Referring to the drawings, a bed is indicated generally at 10 in Figure 1 and comprises a base 11 and a support part 12. As shown in Figure 3, the base comprises a central longitudinally extending member 13 comprising a single tube 14 of cylindrical internal and external configuration having welded thereto at opposite ends transversely extending members 15 which extend perpendicular to the tube 13.

The transversely extending members 15 carry castors 16 in conventional manner.

Welded to the tube 14 so as to extend upwardly therefrom is a mounting part 17 of generally rectangular configuration. Pivotaly connected to the mounting part 17 are a pair of parallel upper and lower links 18, 19 which are pivotaly connected at their one ends to the mounting means 17 about vertically spaced axes 20, 21 whilst at their other ends the links 18, 19 are pivotaly connected to a downwardly extending mounting member 22 about vertically spaced axes 23, 24.

As best shown in Figure 3, the links 18, 19 are disposed on one side of the mounting members 17, 22 by virtue of a pivot pin (not shown) which is housed within a sleeve 25 fixed, for example, by welding, to an aperture in the associated mounting parts 17, 22 and received within a sleeve 26 welded to opposite ends of the respective link 18 with a retaining cap 27 provided to retain the rod in position.

On the opposite side of the mounting members 17, 22 a further link 30 is provided which is pivotaly mounted co-axial with the link 18 by virtue of the abovementioned pivot rod being received in further sleeves 31 welded to the further link 30 and the rod being retained by further retaining caps 27.

As best shown in Figure 1, the further link 30 has a transversely extending lever 32 which is pivotaly connected at 33 to the actuating member 34 of a jack 35 operated by a foot pedal 36.

The downwardly extending mounting member 22 is welded to a central longitudinally extending member 37 of a first section 38 of the support part 12 and is provided with a suitable brace 39. The longitudinally extending member 37, has a transversely extending member 40 welded thereto at one end and an intermediate transversely extending member 41 and a further transversely extending member 42 at its other end. The transversely extending members support an upholstered mattress platform 43.

The transversely extending member 40 is provided with hinges 44 by which a further section which comprises a head section 45 is pivotally connected to the first section 38 for pivotal movement upwardly or downwardly. A stay 46, pivotally connected to the mounting part 22 at 47, is connected to a conventional tilting plate locking mechanism 48 to enable the headrest part 45 to be inclined upwardly or downwardly at a desired angle.

The bed shown in Figures 2 and 4 is essentially similar to that shown in Figures 1 and 3 except that the hydraulically operated jack 35 is replaced by an electrically operated screw jack 35a. In addition, the support part 38 comprises three pivotally interconnected sections. The head section 45 and the right-hand part of the first section 38 are as described hereinbefore but in this embodiment the first section 38 is of shorter longitudinal extent and in the region of the transversely extending member 41 has a legrest section 38a pivotally connected thereto.

Referring now to Figures 6 and 7, there is shown a bed essentially similar to the bed of figures 3 and 4 except that the bed frame is provided with a central longitudinally extending member 13 which comprises two spaced parallel circular cross-section tubes 14a, 14b to which transversely extending members 15 as previously described are welded.

Each tube 14a, 14b has a separate upstanding mounting part 17a, 17b in which a sleeve 25a, 25b is welded. The sleeves 25a, 25b receive a pivot rod (not shown) which is received in a sleeve 26a, 26b welded to the one ends of each link 18a, 19a and 19a, 19b of the sets of links. The other ends of the links are similarly connected to two downwardly extending mounting parts 22a, 22b.

A further link 30a is mounted on the pivot pin by means of a sleeve 31a welded to one end of the further link 30 whilst the opposite link of the link 30 is similarly connected to the pivot rod of the downwardly extending mounting parts 22a, 22b. The further link 30a has a transversely extending arm 32a which is connected to an actuating member 34a of an electrically operated screw jack 35b which is positioned more centrally of the chassis than the screw jack 35a shown in Figure 4.

In all other respects the bed of Figures 6 and 7 is the same as the bed of Figures 3 to 5 except that two rods and tilting plate mechanisms are provided for the

foot and head ends instead of the single rods 46, 46a shown in Figure 5 and the mattress is wider.

Referring to Figures 8 to 12, there is illustrated a dialysis chair 60. The chair 60 comprises a base 11' comprising two parallel tubes 14'a, 14'b similar to the tubes 14a, 14b described hereinbefore. The tubes 14'a, 14'b are shorter than the tubes 14a, 14b and at the foot end of the chair are welded to two diverging further rectangular tubes 60, 61 which carry castors 62 at their outer ends in conventional manner. At their other ends the tubes 14'a, 14'b are connected to a transversely extending member 151 corresponding to the member 15 described hereinbefore.

The chair is provided with a linkage mechanism L as described hereinbefore in connections with Figures 6 and 7. The support part comprises a first, central, section 38' having pivotally connected thereto at opposite ends a backrest part 65 and a legrest part 66. Suitable means such as the rods 46, 46a described hereinbefore may be provided to permit of adjustment of the headrest and legrest parts. Alternatively, and preferably, a gas spring (not illustrated) may be provided to facilitate adjustment of the headrest and/or legrest parts. Further alternatively, at least one of the headrest and legrest parts may be adjusted by a electrically operated screw jack means mounted beneath the first, central, section 38'.

Preferably an interconnecting linkage is provided so that pivotal movement of the headrest part is accompanied by corresponding opposite movement of the legrest part.

If desired, the legrest part 66 may be provided with a footrest part which is pivotal relative to the remainder of the legrest part and the pivotal movement may be controlled by any suitable means such as those previously described for controlling movement of the headrest and legrest parts.

It will be noted that the drive means, which in the version illustrated is an electrically operated screw jack 35'a similar to the screw jack 35a described hereinbefore, is disposed at the head end of the chair whereas in the previously described embodiments the drive means is provided at the foot end of the bed.

If desired, instead of an electrically operated screw jack a foot or power operated hydraulic jack may be provided similar to that described with reference to Figures 1 and 3 and such a jack may be provided in the embodiment of Figures 6 and 7.

The backrest part of the chair is provided with a pair of armrests 70. Each armrest 70 is connected to the chair by a pair of unequal length links 71, 72. The link 71 being half the length of the link 72. At their one ends the links 71 and 72 are pivotally connected to a plate 70a at positions 73, 74 which are spaced apart transversely of the longitudinal extent of the armrest by a distance equal to the length of the link 71.

The plate 70a is mounted to the backrest portion for pivotal movement about a horizontal axis.

At their other ends the links are connected at 75, 76 to a second plate 70b, fixed to the armrest, at positions which are spaced apart by the same distance as the positions 73, 74.

Accordingly, each armrest can be pivoted upwardly about the horizontal axis between the plates 77 and 78 and can also be swung between an inner position in which the links 71, 72 are inclined inwardly at an angle of about 30° and in which the armrest extends substantially longitudinally of the chair but slightly diverging at an angle of 5° and an inoperative position in which the armrest is pivoted outwardly through about 90°.

The features disclosed in the foregoing description, or the accompanying drawings, expressed in their specific forms or in the terms or means for performing the desired function, may, separately or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

Claims

1. A patient support comprising a base, a support part and a linkage to mount the support part on the base for movement up and down relative to the base, wherein the linkage comprises a pair of upper and lower links pivotally connected at their one ends to the base at vertically spaced positions and pivotally connected at their other ends to the support part at vertically spaced positions, and drive means to cause the support part to move up and down relative to the base as a result of pivotal movement of the links.
2. A patient support according to Claim 1 wherein the links are pivotally mounted on one side of an upwardly extending mounting part provided on the base and on one side of a downwardly extending mounting part provided on the support part.
3. A patient support according to Claim 1 or Claim 2 wherein the linkage includes a further link pivotally connected at one end to the base and at its other end to the support part about axes which are co-axial with the axes of pivot of the upper of said pair of upper and lower links.
4. A patient support according to Claim 3 when dependent on Claim 2 wherein the further link is disposed on the opposite side of said mounting parts to said pair of upper and lower links.
5. A patient support according to Claim 1 wherein two pairs of upper and lower links are provided, each pair being pivotally connected at their one ends to the base at vertically spaced positions

and pivotally connected at their other ends to the support part at vertically spaced positions.

6. A patient support according to Claim 5 wherein the links of one pair are pivotally mounted on one side of an upwardly extending mounting part provided on the base and one side of a downwardly extending mounting part on the support part whilst the links of the other pair are pivotally mounted on the other side of a second upwardly extending mounting part provided on the base and on the other side of a second downwardly extending mounting part provided on the support part, said other sides facing in the opposite direction to said one side.
7. A patient support according to Claim 6 wherein the linkage includes a further link pivotally connected at one end of the base about the axis of pivotal connection of the upper of each pair of links to the base and at its opposite end to the support part about the axis of pivotal connection of the upper link of the pair of links to the support part with the further link being disposed between the upwardly extending mounting parts provided on the base and the downwardly extending mounting part provided on the support part.
8. A patient support according to any one of the preceding claims wherein the base comprises a generally centrally disposed longitudinally extending member and, at opposite ends thereof transversely extending members provided with a ground-engageable means, the patient supporting part being carried by the longitudinally extending member.
9. A patient support comprising a base and support part mounted on the base where the base comprises a generally centrally disposed longitudinally extending member and at opposite ends thereof transversely extending members provided with ground-engageable means, the patient supporting part being carried by the longitudinally extending member.
10. A patient support according to Claim 8 or Claim 9 wherein the transversely extending member of one end of the base extends perpendicular to the longitudinally extending member and/or the transversely extending member at one end of the base comprises a pair of inclined elements which diverge longitudinally and transversely from the longitudinally extending member.
11. A patient support according to Claim 8 or Claim 10 wherein the upwardly extending mounting part extends upwardly from the longitudinally extend-

ing member.

- 12.** A patient support according to Claim 10 wherein the longitudinally extending member comprises either a) a single circular cross-section tube and, where a single upwardly extending mounting part is provided, the upwardly extending mounting part extends upwardly from the tube, or b) a pair of spaced parallel circular cross-section tubes interconnected by transversely extending members and, where two upwardly extending mounting parts are provided, one mounting part extends from each of the tubes.

- 13.** A patient support comprising a base and a support part mounted on the base and comprising a chair, the chair being provided with at least one armrest connected to the chair for movement between a position in which the armrest extends generally longitudinally of the chair to a position in which the armrest extends transversely outwardly of the chair.

25

30

35

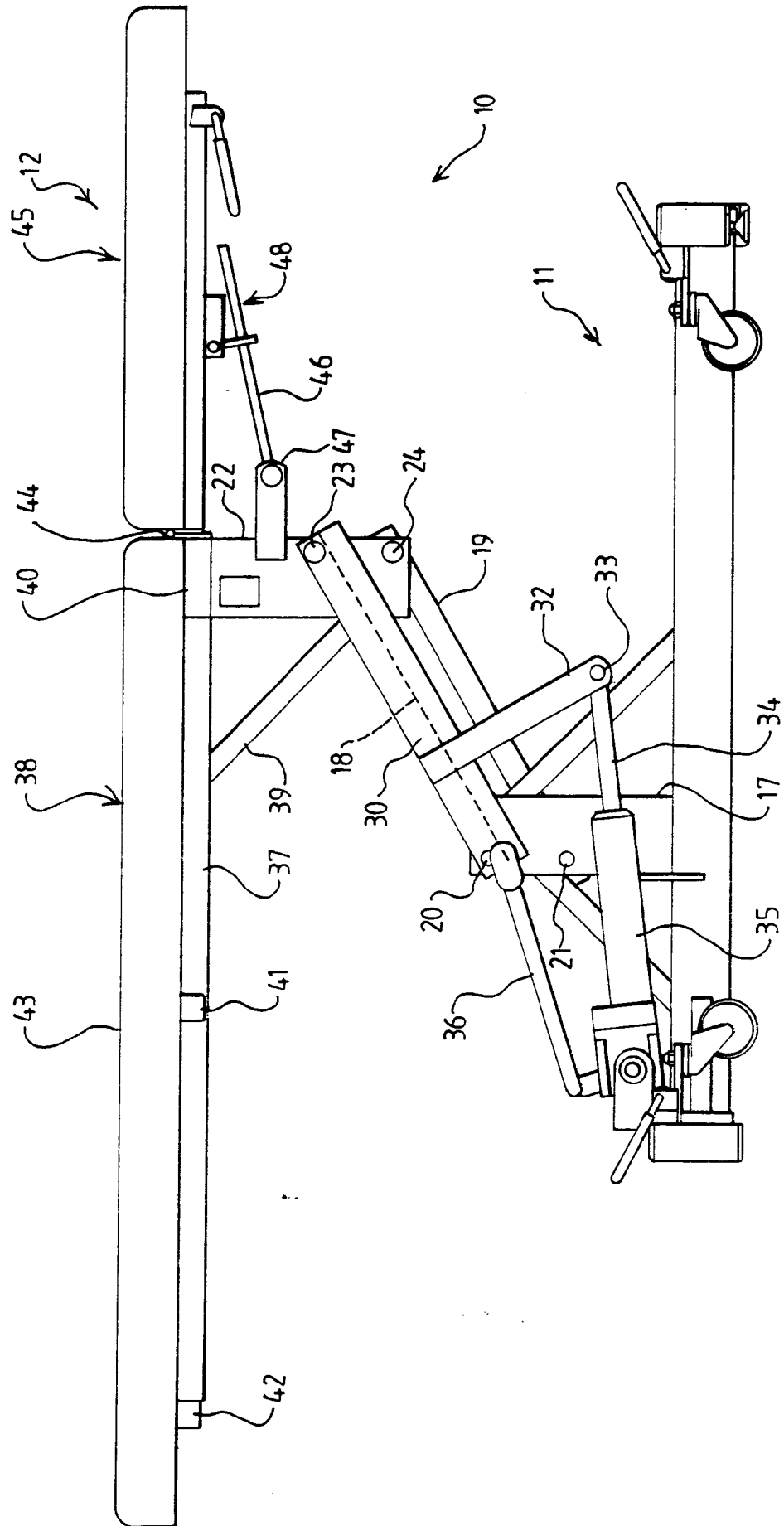
40

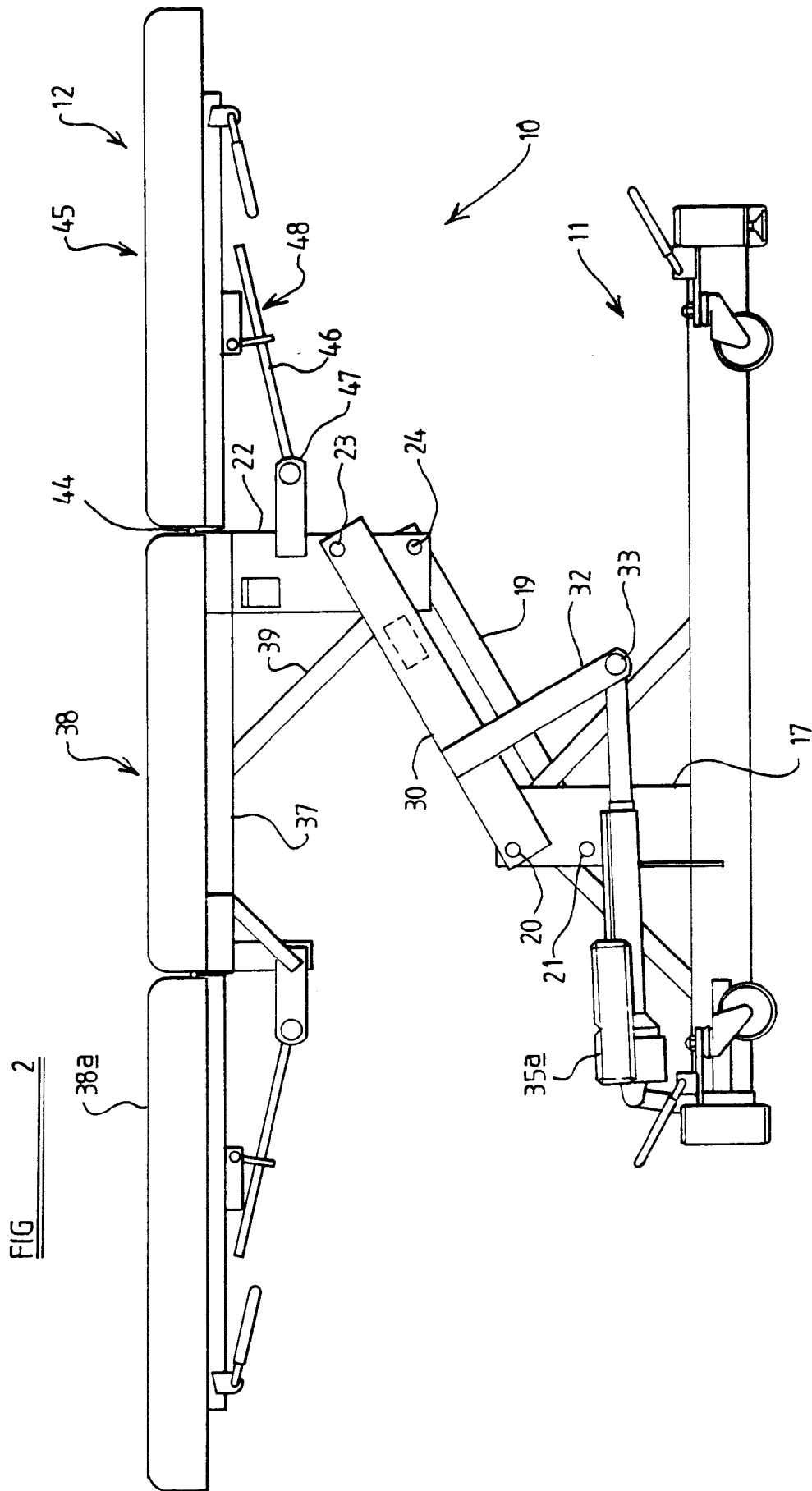
45

50

55

FIG 1





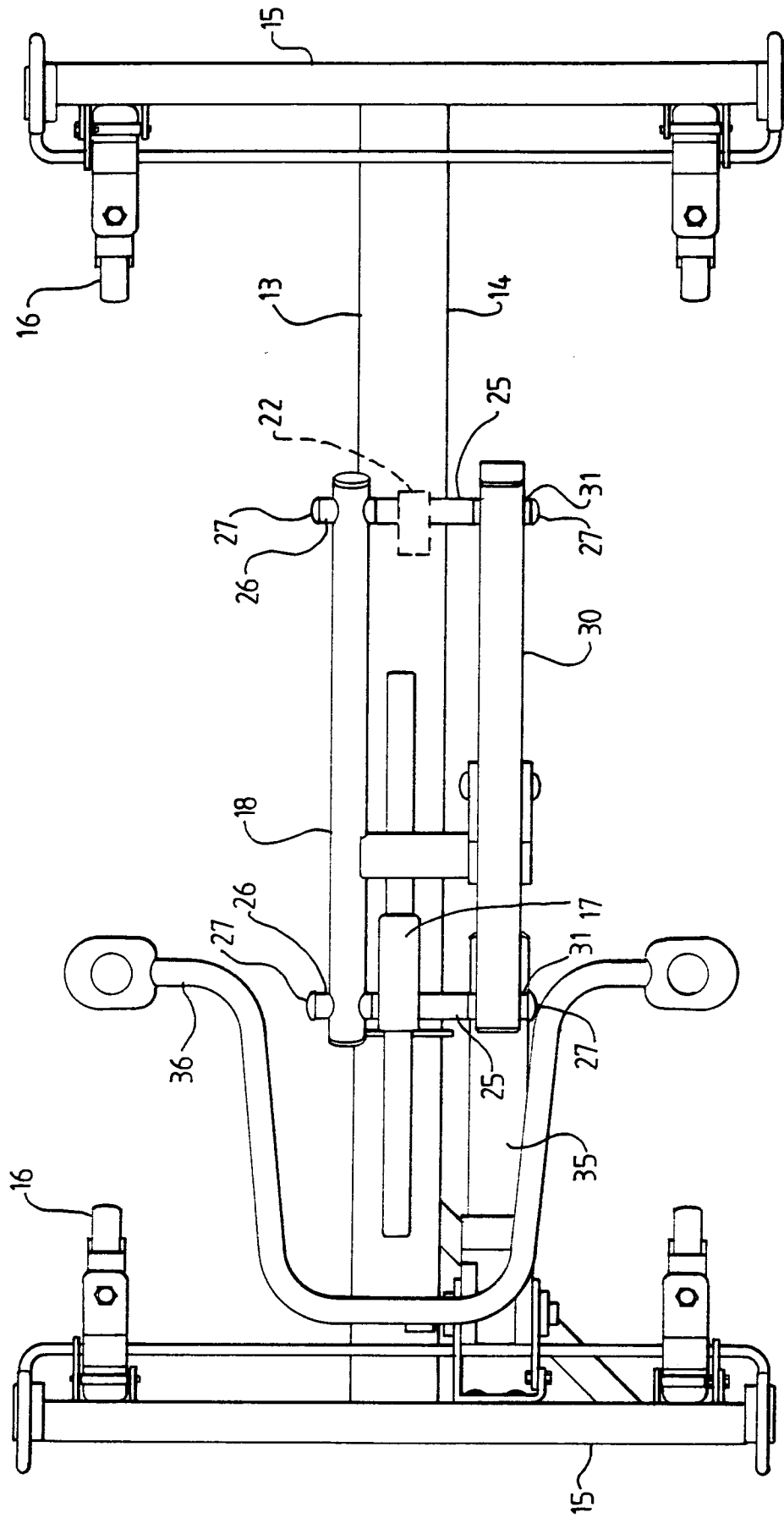


FIG 3

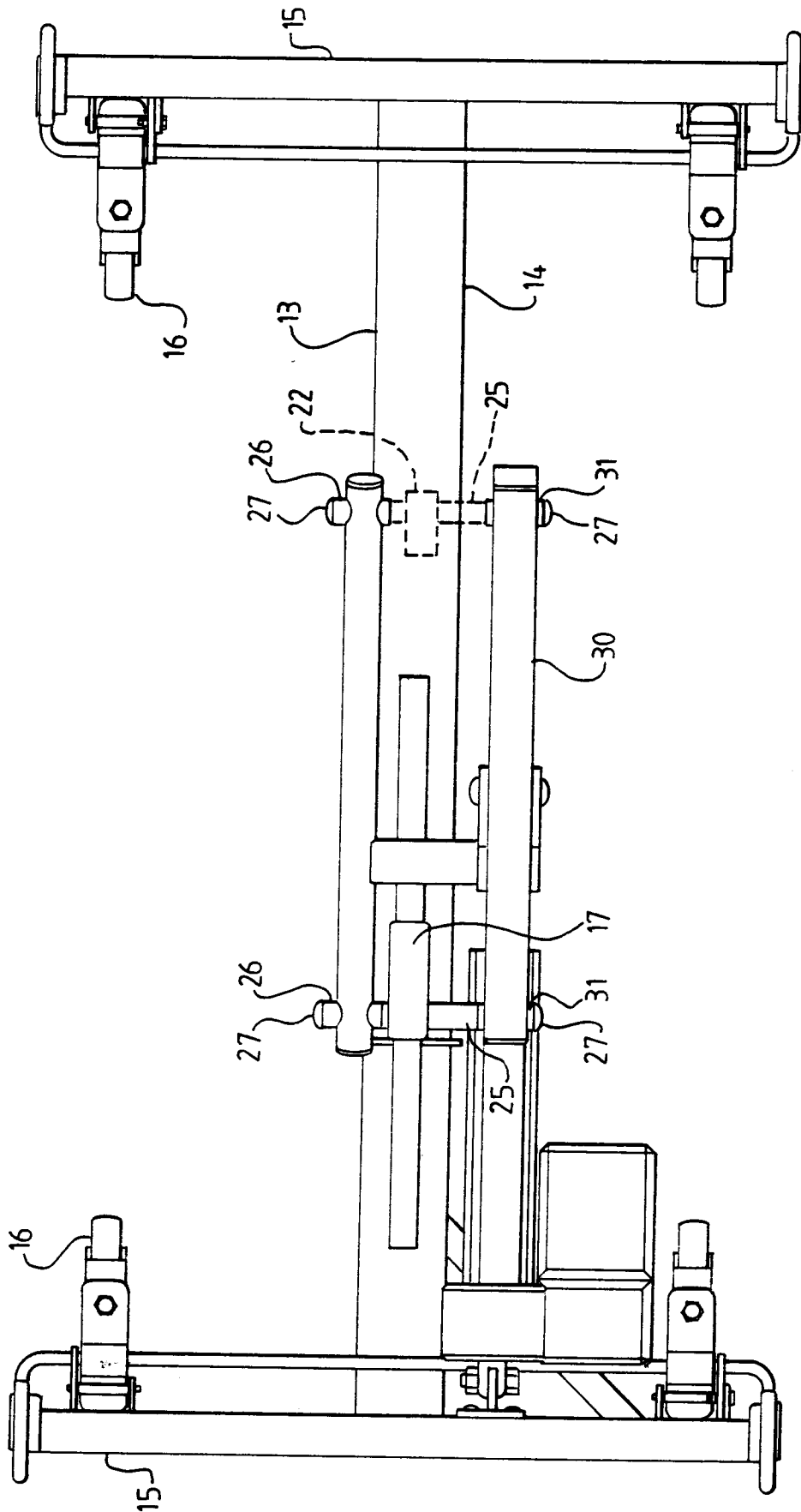
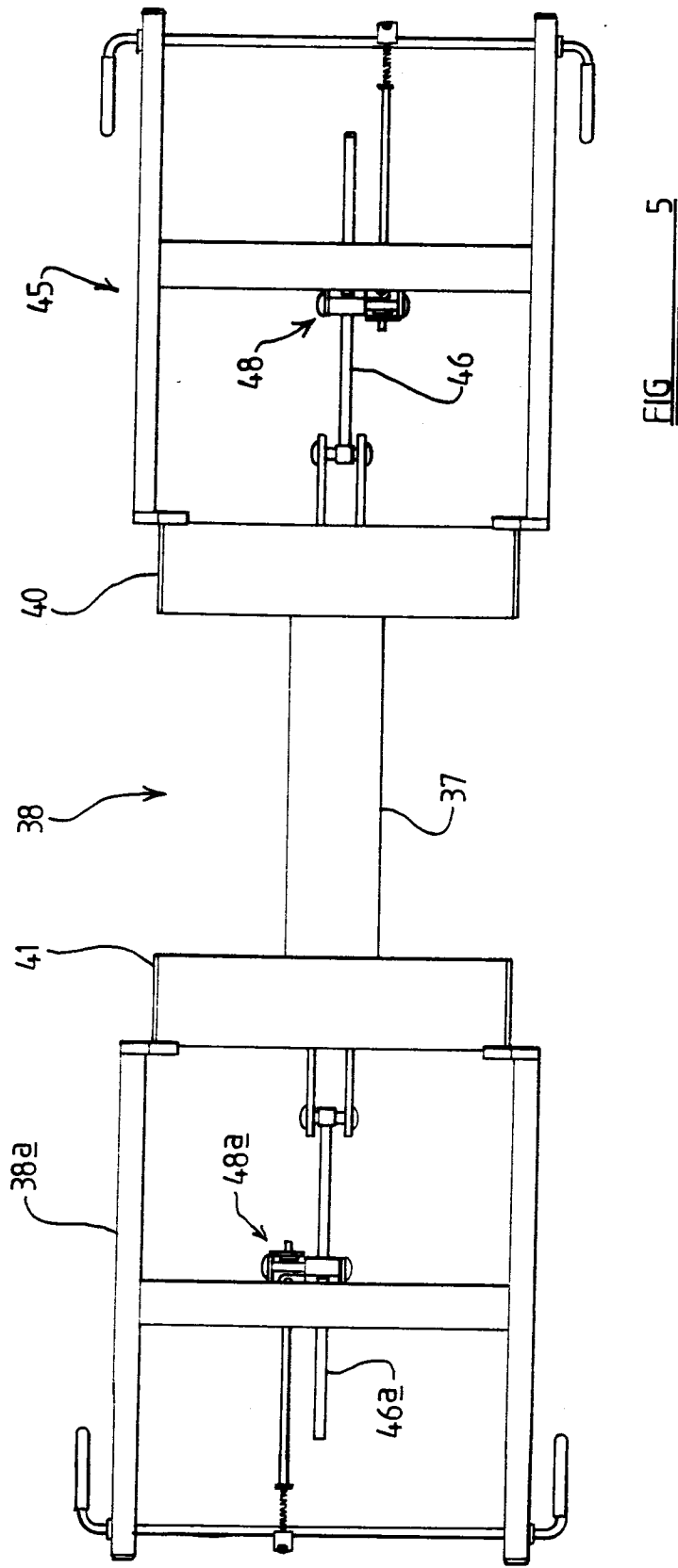
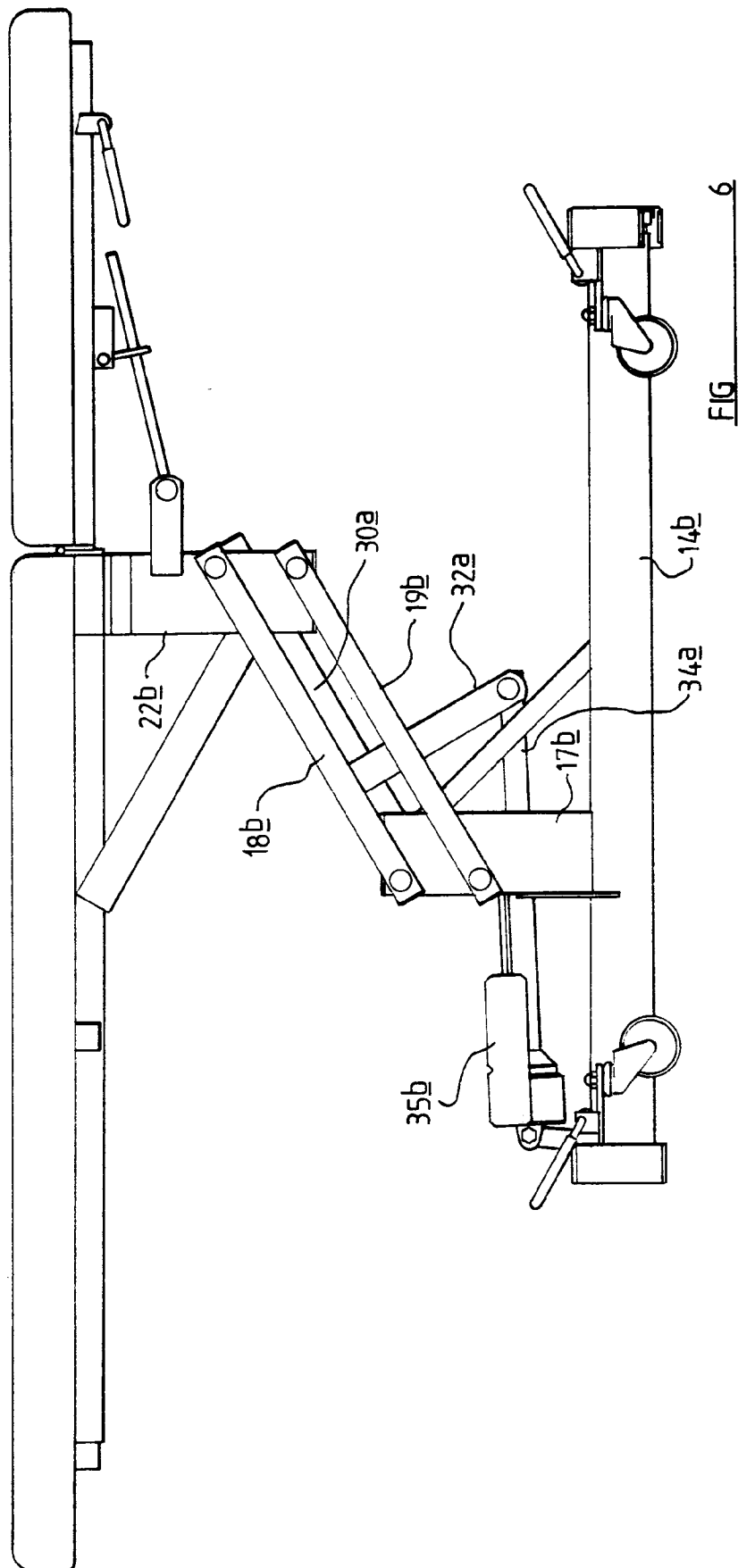


FIG 4





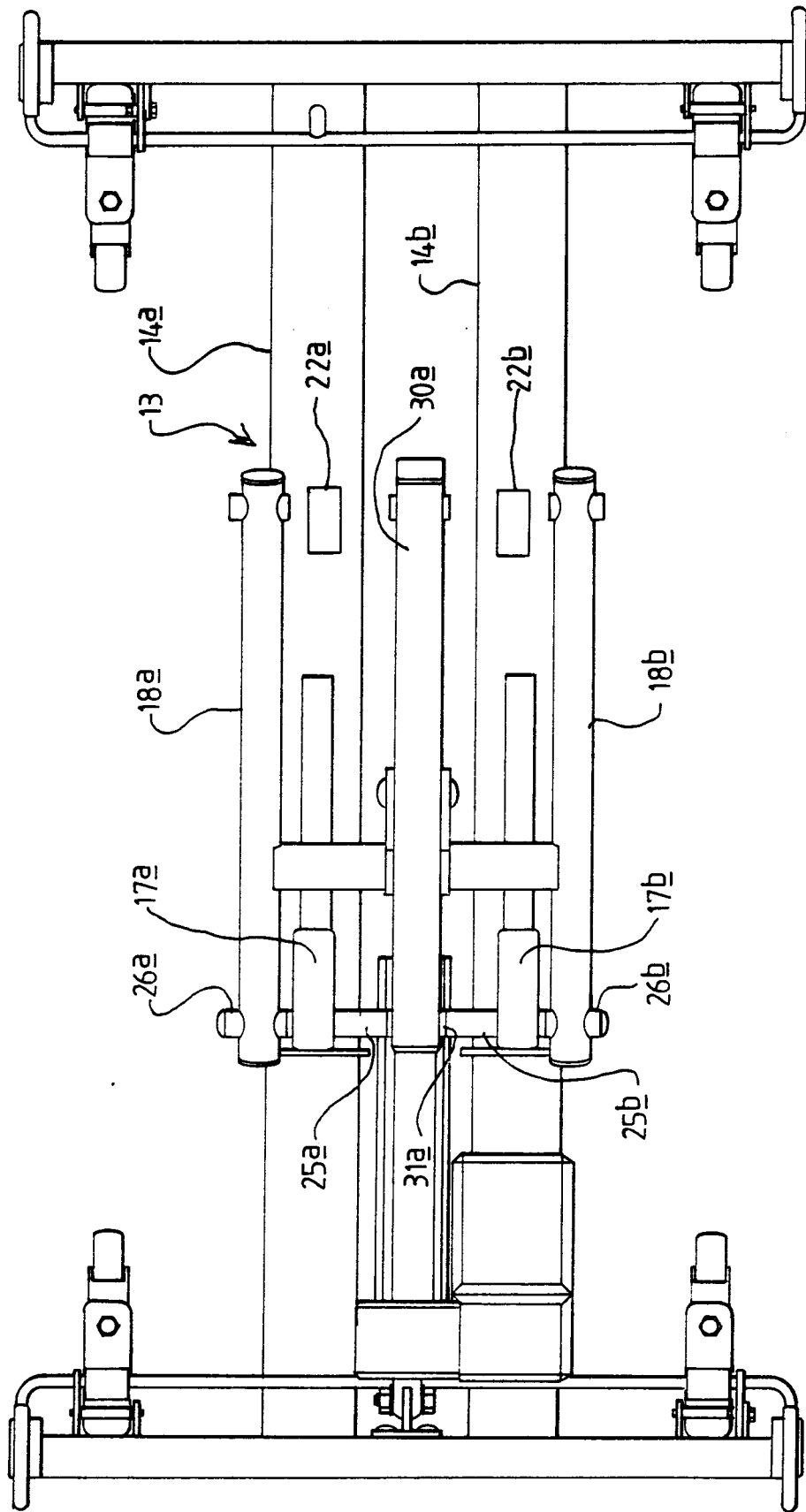
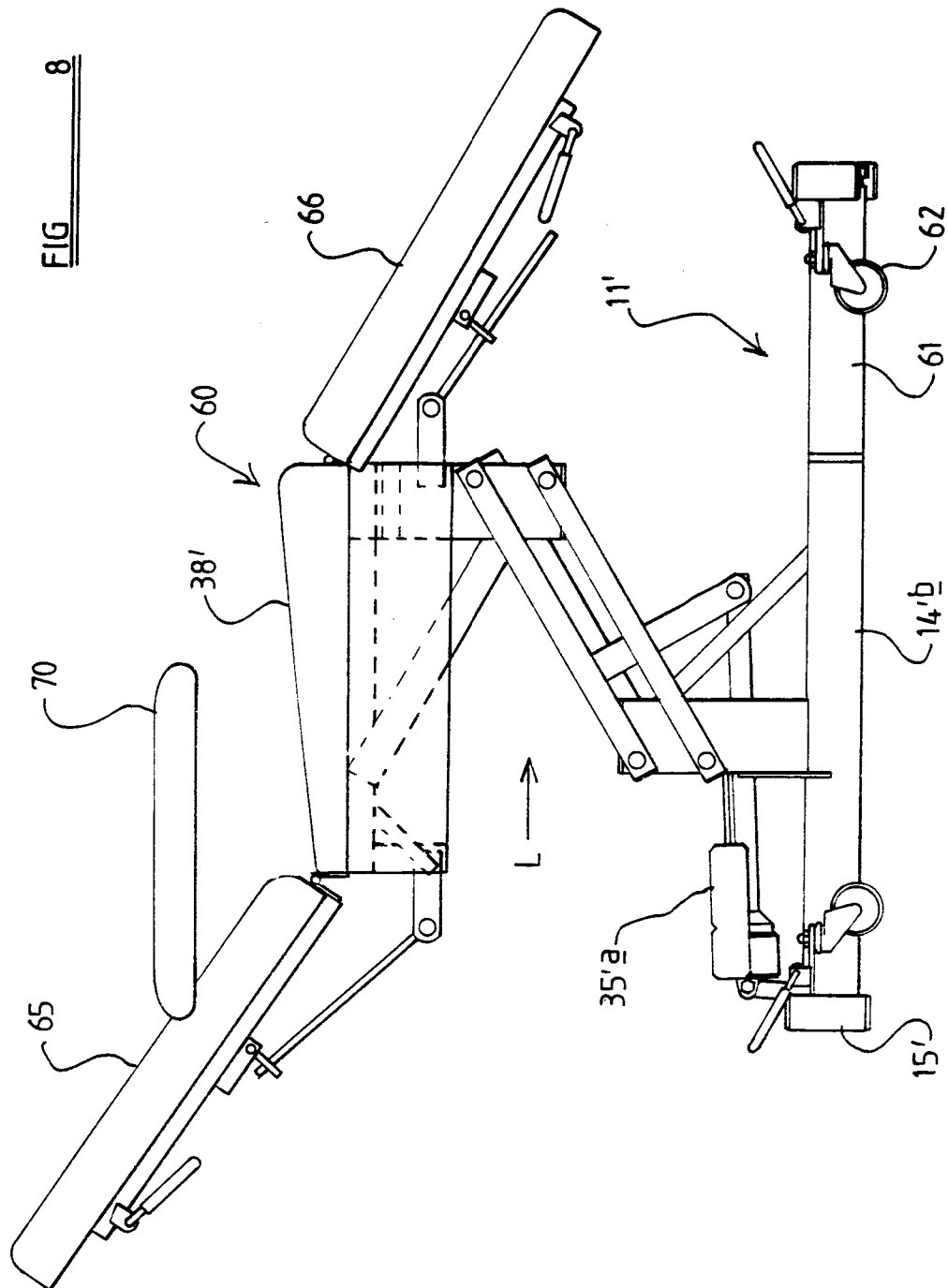


FIG 7



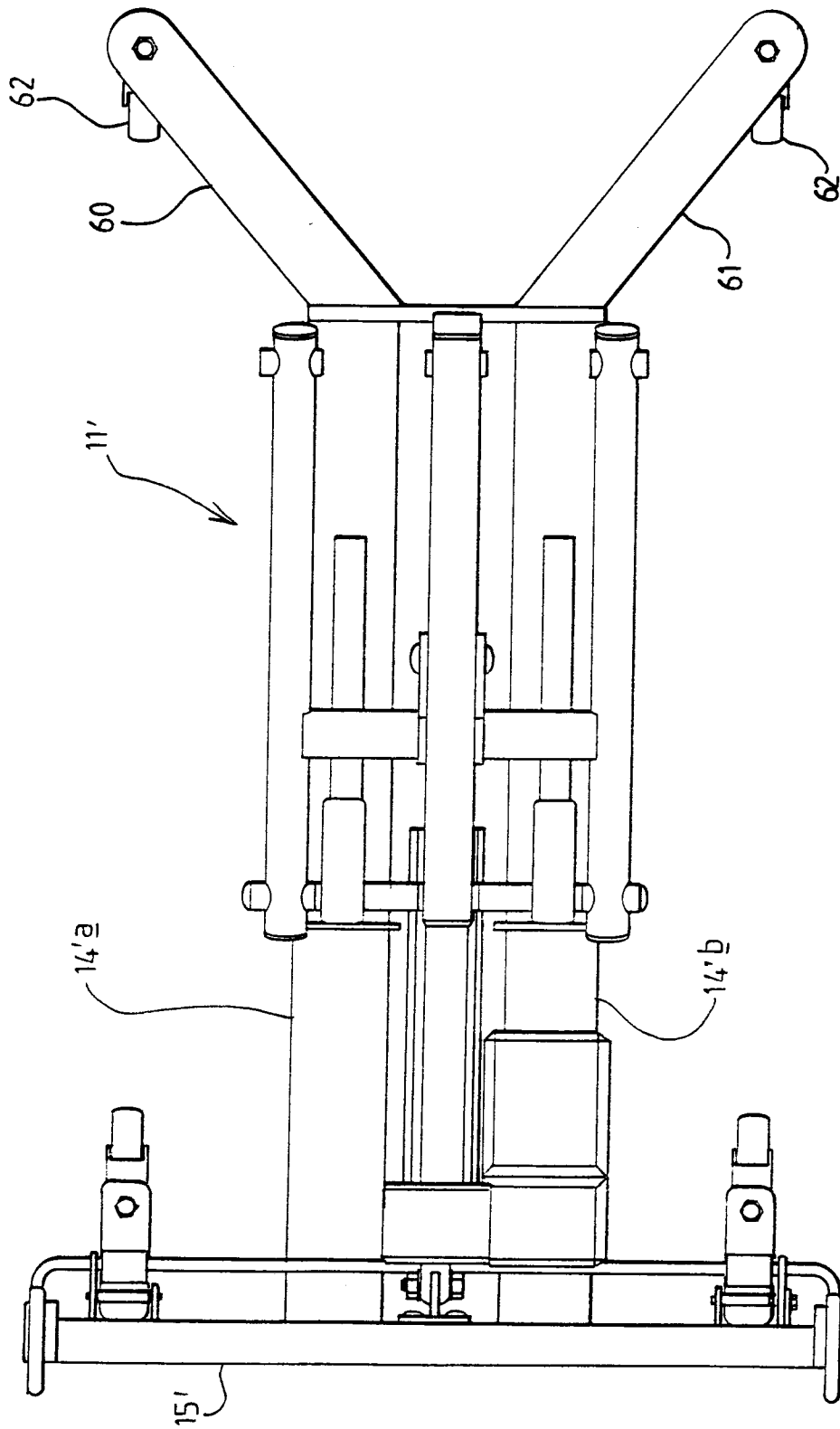


FIG 9

